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UNITED STATES DEPARTMENT OF AGRICULTURE

Weather Bureau  
Instrument Division

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Specifications for Aneroid Barometers, Standard Grade.

Type.— These specifications cover only round dial aneroid barometers approximately 5-1/2 inches in diameter.

Material and workmanship.— The materials used shall be entirely suitable for the purpose. Non-ferrous materials shall be used for all parts of the mechanism except where ferrous materials are essential. When materials are used which are subject to corrosion in salt air or other atmospheric conditions likely to occur during service usage, they shall be protected against such corrosion in a manner which will in no way prevent compliance with the performance requirements of these specifications. The use of any protective coating which will crack, chip or scale with age or extremes of atmospheric conditions shall be avoided. Workmanship shall be thoroughly neat and adequately accurate to the satisfaction of the Weather Bureau. Instruments shall be so constructed that no parts are likely to work loose in service. They shall be built to withstand the strains, jars, vibrations, and such other conditions as are incident to usual shipping, storage, installation, and service. The instruments shall be furnished completed, tested, and ready for service.

Case.— To be well and substantially made of non-corrosive material, approximately 5-1/2 inches in diameter and 2-1/2 inches deep, and provided with a pendant so instrument can be hung up. If the cases are made of metal they shall have a protective coating of lacquer or enamel and carefully finished. If of synthetic material composed of a suitable filler and phenol condensation product binder they shall be of the hot molded type. The cases of synthetic material shall be uniform in texture, shall have a smooth surface and shall be subject to approval by the Weather Bureau.

Dial.— To be of silvered brass and divided from 25 to 31 inches of mercury in 0.02-inch subdivisions, with bold figures at the inch points. The inches and tenths graduations are to be longer than the subdivisions graduations. All lines and numbers are to be clean cut and clear, and uniformly filled with black pigment. The graduations are to extend over 360 degrees of arc. The dial to have an opening in the center about 2-1/4 inches in diameter. The words rain, change, fair, etc., customarily printed on the dial are to be omitted.

Glass.— A good glass cover 4-15/16 inches, plus or minus 1/32-inch diameter, flat, clear, and free from bubbles or flaws to be provided, but no set hand. The glass shall have a smooth edge and shall not be bevelled.



Hand.- The hand shall be finished black. The hand must be carefully balanced. The breadth at the end extending near the graduations shall be a minimum. The hand must be carefully centered relative to the graduations of the dial.

Inspection.- The instrument shall be subject to inspection by the Weather Bureau. Whenever the pressure and temperature existing at the time of the test are not specified definitely, it is understood that the test is to be made at an atmospheric pressure of 29.92 inches of mercury and at a room temperature of plus 70 degrees F. Except where otherwise specified, the instrument shall be tested in an upright vertical position and shall be lightly vibrated or tapped before a test reading is taken. Instruments will be examined for mechanical and other defects. Instruments will be rejected for the following causes:

1. Those that show poor finish of any of their visible parts.
2. Those that show signs of corrosion of any of their parts, especially on the movements.
3. Those with broken cover glasses.
4. Those having loose parts or loose solder in their cells.

Position.- Difference between readings with dial vertical and dial horizontal shall not exceed 0.04 inches.

Temperature compensation test at 30-inch pressure.- For a period of not less than 24 hours prior to this test, the instrument shall not have been subjected to any test involving pressure or temperature changes other than the usual atmospheric pressure and room temperatures. The instrument is then to be subjected for three hours to a constant temperature of plus 110 degrees F., and subsequently for three hours to a constant temperature of plus 32 degrees F. The error at these two temperatures must not differ from that at 70 degrees by more than .015 inch.

Temperature compensation test at 27-inch pressure.- The instrument is to be maintained at a pressure of 27.00 inches of mercury. Its readings will be made at room temperature, 70 degrees. The temperature of the instrument is then to be changed to plus 32 degrees F. and held constant for three hours. The error then determined must not differ from the one at plus 70 degrees F. by more than .02 inch.

Calibrating error test at room temperature, pressure decreasing.- The instrument is to be held at a temperature of approximately 70 degrees F. for three hours. With the pressure decreasing from atmospheric pressure at the rate of 1 inch of mercury in 5 minutes the instrument will be tested at 5 points chosen at random throughout its range. The errors of the instrument shall not exceed 0.04 inch of mercury, the



pressure at each test point being determined by an accurate pressure measuring instrument suitably connected to the testing apparatus. The movement of the pointer shall be free from backlash and any irregular motion when the pressure is varied uniformly.

Calibration error test at room temperature, pressure increasing.- When the lowest pressure in the preceding test is reached, the pressure will be immediately increased at the rate of one inch of mercury in five minutes and readings taken at the same 5 points as those chosen in the preceding test. The errors of the instrument shall not differ from those at the same reading in the preceding tests by more than 0.01 inch of mercury.

Change in magnitude of calibration errors.- The calibration errors of the instruments which are determined in above pressure tests at room temperatures shall not change in magnitude by more than 0.01 inch for readings differing by 1 inch of mercury.

Drift test.- The instrument is to be held at room temperature for three hours. The pressure will be decreased at a rate of 1 inch of mercury in 5 minutes for a pressure change of approximately 2 inches of mercury and a reading taken. The pressure will then be held constant for one hour; the change in the reading of the instrument shall not be more than 0.01 inch of mercury.

Packing.- Each instrument or part thereof shall be neatly wrapped in suitable tissue or absorbent paper and securely packed with a suitable packing material to protect it from impact encountered in shipment. Each carton shall be securely sealed with sticker tape. The manufacturer shall pack the cartons in a strong box suitably marked for shipment to destination.

Legend.- Each barometer to bear the legend "U.S.W.B." and to be numbered serially as directed when the order is placed.

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